



# Smart Tweezers™

## Colibri ST5-S

LCR Meter and Component Identifier  
In a Pair of Tweezers



### A New Model of Smart Tweezers: the ST-5S

With just a touch of the Smart Tweezers' tips to a component, and the measurement values are available instantly. There is no set-up required; Smart Tweezers determines the type of component, the proper test signal and frequency for the highest accuracy measurement results. Smart Tweezers does it all, and then relays the main impedance values in L, C or R but also the parasitics such as R for L and C.





Smart Tweezers was designed for making evaluating and troubleshooting Surface Mount Technology simple. The innovative mechatronic design combines a high-precision fully-automatic digital LCR-meter with a pair of gold-plated tweezers and an LCD screen into a lightweight, pocket sized device. The outcome is a user-friendly experience, and very low and well-defined parasitics.

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### Feature Summary for ST-5S

- Fully automatic measurement of Inductance, Capacitance and Resistance
  - Basic Accuracy of 0.2%
  - Automatic selection of the best range
  - Component sorting with 1, 5, 10 and 20% tolerance
  - Lithium-Ion battery and USB Charger
  - Continuity and Diode test
  - Semi-automatic offset subtraction
  - Weight of 52 grams (less than 2 oz)
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### Smart Tweezers Measurement of Inductance, Capacitance, Resistance

Once Smart Tweezers probes make a contact with a component, you see the reading of the main impedance component (L, C, or R) on the Primary display. The secondary display (at the top of the LCD screen) shows value of the secondary impedance component, such as a parasitic resistance of the capacitor (equivalent series resistance ESR).

### Smart Tweezers' Controls

Smart Tweezers Navigation Controller button allows to select a function or to change settings. Push the Navigation Controller button left/right/up/down to change a setting or press it to activate the Menu. The quick change navigation allows users to easily change the modes and functions, ie: by pushing the button upward, the test signal levels change.

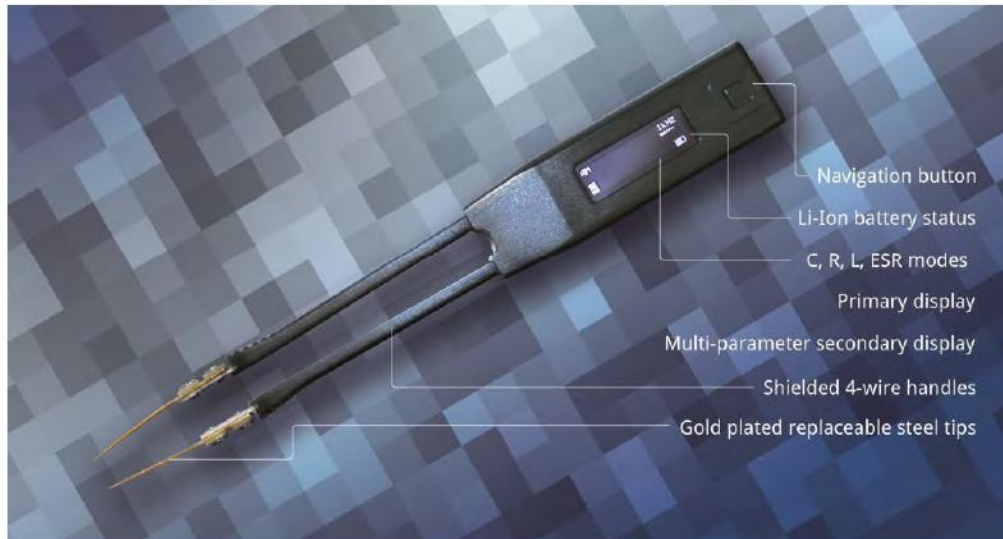


## Specifications

Physical Specifications	
Operating Temperature:	0 °C to +50 °C
Storage Temperature:	-40 °C to +70 °C
Relative Humidity:	0 % to 90 % (0 °C to 35 °C) 0 % to 70 % (35 °C to 55 °C)
Altitude Operating:	0-2000 meters
Battery Type:	3.7 V LiPO rechargeable 150 mAh
Typical Charge Time:	2 hour charge time, 80 hours battery life
Electromagnetic Compatibility (EMC):	Susceptibility and Emission: CE 89/336, FCC 15 part B
Size:	14.0 x 2.5 x 3.0 cm (3.94 x 0.9 x 1.5 in)
Weight:	53 grams (0.11lb)
Warranty:	1 year
Basic Specifications for ST-5S	
Measured Parameters:	L, C, R, ESR, D, Q
Measuring Frequencies:	100 Hz, 120 Hz, 1 kHz, 10 kHz
Measurement rate:	1 time per second
Resistance:	0.05 Ohms to 9.9 MOhms
Capacitance:	0.5 pF to 4,999 $\mu$ F
Inductance:	0.5 $\mu$ H to 999 mH
Dissipation Factor:	0.001 to 1000
Accuracy Specifications	
Accuracy is specified at 18°C to 28°C (64°F to 82°F), with relative humidity to 90%.	
Resistance:	
Accuracy:	0.2% in range 100 R to 10 K, 0.5% in range 1 R to 1 M
Capacitance:	
Accuracy:	0.2% in range 10 nF to 10 $\mu$ F, 0.5% in range 100 pF to 1 mF
Inductance:	
Accuracy:	0.2% in range 10 mH to 100 mH, 0.5% in range 100 $\mu$ H to 1H



## LCR-Reader Model: LCR-R1



The world first handheld LCR-meter, Smart Tweezers LCR-meter is a small and light tool designed use in Surface Mount Technology (SMT). This design combining a set of tweezers tips, an LCD and an LCR-meter completely transformed the way to evaluate components. Easy one hand operation leaves the other free for other tools.



LCR-Reader is twice as light as Smart Tweezers ST-5 and also powered by Li-Ion rechargeable battery with a micro-USB charger connector. Basic accuracy of the new device is about 1%.

There is just one button that turns the device on and allows changing the measurement mode by a single button push: A (automatic), L (inductance), C (capacitance), R (resistance), and ESR (equivalent series resistance). All measurements are done automatically, test signal amplitude is fixed at 0.5 Volts, test frequency is automatically adjusted according to the component type and value.

Similarly to Smart Tweezers, LCR-Reader in addition to the main impedance component L, C or R it will also show the parasitics, such as R for L, C and C for R.

The new LCR-Reader is powered by a Li-Ion battery, rechargeable via micro-USB.

The device features a lower weight, with about 1% basic accuracy.

**Professional Quality LCR- and ESR- meter**

- Automatic L-C-R and Equivalent Series Resistance (ESR) measurement
  - Automatic best test frequency and range selection
- High-precision gold-plated probes for small-size components
- High contrast OLED display and Li-Ion rechargeable battery



## Accuracy Specifications

### Resistance, 1 kHz test frequency Typical offset 30mΩ (tips resistance)

Range	Resolution	Accuracy
10 Ω	0.01R	1.0% + 30
100 Ω	0.01R	1.0% + 5
1000 Ω	0.1R	1.0% + 3
10 kΩ	0.001K	1.0% + 2
100 kΩ	0.01K	1.0% + 2
1000 k Ω	0.1K	1.0% + 5
10 MΩ	0.001K	2.0% + 10

Accuracy for the ranges 1 R ~ 100 R is specified after subtraction of the offset resistance

### Physical Specifications

Size: 14.8 x 2.0 x 1.5 cm (5.8" x 0.76" x 0.57")

Weight: 29 grams (1 Oz)

Operating temperature: 0°C to 50°C

Battery Type: 3.7 V LiPO rechargeable 220 mAh

Battery Life: Continuous 20 hours (2 hours charging cycle) Test frequency: 1 kHz, 10 kHz, 100 Hz

Test signal level: 0.5 +/- 5% Vrms Sine wave

### Measurement Ranges

Resistance: 0.05 Ω to 9.9 MΩ

Capacitance: 0.5 pF to 4999 μF

Inductance: 0.5 uH to 999 mH

### Capacitance, automatic test frequency Typical offset 0.25pF (tips capacitance)

Range	Resolution	Accuracy
10 mF	0.001 mF	5.0% + 50
1000 μF	0.1 μF	2.0% + 10
100 μF	0.01 μF	1.0% + 10
10 μF	0.001 μF	1.0% + 5
1 μF	0.1 nF	1.0% + 5
100 nF	0.01 nF	1.0% + 5
10 nF	0.001 nF	1.0% + 5
1000 pF	1 0.0 pF	1.0% + 5
100 pF	1 .0 pF	1.0% + 10
10 pF	0.1 pF	5.0% + 50

Accuracy for the ranges of 10 pF~1000 pF is specified after subtraction of the stray capacitance for test leads

### Inductance, automatic test frequency

Range	Resolution	Accuracy
10 μH	0.1 μH	1.0% + 50
100 μH	0.1μH	1.0% + 20
1 mH	0.1 μH	1.0% + 5
10 mH	0.001 mH	1.0% + 5
100 mH	0.01 mH	1.0% + 5
1 H	0.1 mH	1.0% + 10



## Comparison of Smart Tweezers Model : ST5 and LCR-Reader

Feature	New Model ST5S	LCR-Reader
Automatic LCR Measurement	Yes	Yes
Manual LCR Measurement	Yes	Yes
Diode Test	Yes	No
Continuity Test	Yes	No
DC Voltage Measurement	No	No
AC Voltage Measurement / Trace	No	No
Rechargeable Batteries	Standard	Standard
Charger and Micro-USB Cable	Standard	Optional
Designated ESR Measurement	Yes	Yes
Automatic Offset Subtraction	Yes	No
Component Sorting	Yes	No
<b>Technical Specs</b>		
Test Frequency	0.1, 0.12, 1, 10 kHz +/- 0.005%	0.1, 0.12, 1, 10 kHz +/- 0.5%
Test Signal Level	0.25, 0.5, 1.0 +/- 5% Vrms	<a href="#">0.25, 0.5 +/- 5% Vrms</a>
Source Impedance	62.5Ω/1kΩ/16kΩ +/- 1%	62.5Ω/1kΩ/16kΩ +/- 1%
<b>Typical Accuracy</b>		
Resistance	0.20%	<a href="#">1.00%</a>
Capacitance	0.50%	1.00%
Inductance	0.50%	1.00%
<b>Measurement Range</b>		
Resistance	0.1 Ohm to 10 Mohms	0.1 Ohm to 10 Mohms
Capacitance	0.5 pF to 1 mF	10 pF to 1 mF
Inductance	0.5 uH to 1 H	0.5 uH to 1 H



## LCR METER

### LCR METER



**sanwa**  
JAPAN



### LCR700

- Measuring Frequency DC~100kHz
- Ls/Lp/Cs/Cp measurement with sub parameters (D/Q/θ/ESR)
- Automatically selectable L/C/R measurement
- Device Sorting mode
- Optical link USB interface (optional)
- Data hold, Back light
- Sampling rate: 1.2 time/sec. (LCR Mode) 0.5 times/sec. (DCR Mode)  
From: SANWA JAPAN

**Optional**  
SMD Clip Lead



SI

LCR700	Measuring range	Best accuracy
Ls/Lp	20.000 $\mu$ /200.00 $\mu$ /2000.0 $\mu$ /20.000m/200.00mH 2000.0m/20.000/200.00/2000.0/20.000kH	$\pm$ (0.3%+3)
Cs/Cp	200.00p/2000.0p/20.000n/200.00n/2000.0nF 20.000 $\mu$ /200.00 $\mu$ /2000.0 $\mu$ /20.00mF	$\pm$ (0.3%+3)
Rs/Rp	20.000/200.00/2.0000k/20.000k $\Omega$ 200.00k/2.0000M/20.000M/200.0M $\Omega$	$\pm$ (0.3%+3)
$\Omega$	200.00/2.0000k/20.000k/200.00k $\Omega$ 2.0000M/20.000M/200.0M $\Omega$	$\pm$ (0.3%+3)
Battery	6LF22 (9V) $\times$ 1	
Size / Mass	H184 $\times$ W87 $\times$ D45/approx. 400g	
Standard accessories included	Clip lead (CL-700), Holster (H-701), Instruction manual	

**Safety:** IEC61010-031